DOCUMENT RESUME

ED 077 870 SP 006 550

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TITLE A Working Model of: A Competency-Based Teacher Education System.
INSTITUTION Wayne State Univ., Detroit, Mich. Dept. of Vocational and Applied Arts Education.
PUB DATE 73
NOTE 12p.; Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, Louisiana, February 1973

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Educational Programs; *Evaluation; Instructional Systems; Models; Performance; *Performance Based Teacher Education; Performance Criteria; *Performance Specifications; *Teacher Education

ABSTRACT

This document describes the instructional and the management information aspects of a competency-based education system. The discussion revolves around an explanation of the principles upon which the model is based, a description of the model itself, and an explanation of the developmental processes used to bring the system into fruition. (Author/JB)

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A WORKING MODEL OF:
A COMPETENCY-BASED TEACHER EDUCATION SYSTEM

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However, we feel that the traditional management processes usually do not provide for the systematic collection and distribution of data for feedback to keep a CBTE system functioning properly. The system demands an Instructional System which is supported by and meshed with a management Information System--two facets working towards one end--the attainment of teacher competencies.

Instructional System

This instructional program has five elements--competencies, performance objectives, needs assessment, delivery systems, and evaluation. Each component is closely related to the others and together they form the bases of programs which provide for accountability.[2]

Competency

The distinction between "performance" and "competency" is elusive. The literature and even groups actually working on competency-related projects were unable to provide a definition. Thus, a functional definition of "competency" was devised.

> DEFINITION: A competency is knowledge, skills, and judgment which the student will demonstrate at a pre-determined proficiency level before initial and/or continuing certification.

Our initial list of competencies was based upon the first Cotrell list of 255 competencies which resulted from a project at the Ohio State Center for Vocational and Technical Education.[3] However, this list was substantailly modified by the Wayne State VAE faculty to reflect the emphases and concerns of our program. Our pre-certification list now has 75 competencies.

These competencies have been evaluated by over 3,000 people representing business and industry, vocational program graduate, school administrators, and teachers.

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[2]The general design of the VAE Instructional System parallels the Accountability Model of the Michigan Department of Education.

[3]Calvin J. Cotrell, et al., Model Curricula for Vocational and Technical Teacher Education: Report No. 11-General Objectives-Set 1, (Columbus, Ohio: The Center for Vocational and Technical Education, 1971).

Background

Competency or performance-based instructional programs are being widely discussed and implemented in teacher education programs.[1] The following model describes a systems approach to teacher education which utilizes the tenets of competency-based instruction. This system has been developed and is operating in the Department of Vocational and Applied Arts Education at Wayne State University in Detroit, Michigan. Wayne State is an urban university, the sixth largest university in the United States and has the third largest graduate school. The development of this competency-based teacher education (CBTE) program was funded July, 1971, as a three-year project, by the Michigan Department of Education as an initial phase of its effort to establish competency-based teacher certification procedures. This funding provided for an eight person Systems Staff to do the developmental work.

The Department of Vocational and Applied Arts Education, or VAE, is a new unit with over 1,100 students and 18 full-time faculty. This unit was formed with the merger of Business and Distributive Education, Family Life Education, and Industrial Education, in January, 1971. And it was this merger which provided the impetus to develop a new curriculum using a systems approach to the preparation of teachers, supervisors, and administrators of Vocational and Applied Arts.

The VAE System has two major components: 1) an instructional system and 2) a management information system. The fact that there are these two components is somewhat unique. Most CBTE programs give little or no attention to the development of a supporting management information system.

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[1]Elam, Stanley, "Performance-Based Teacher Education: What Is the State of the Art?", American Association of Colleges for Teacher Education, December, 1971.

Relationship between Competencies and Performance Objectives

Competencies and performance objectives are related. The mastery of several performance objectives would enable the student to demonstrate a competency. To illustrate, below is one of the competencies of an effective VAE teacher, and at least two of the performance objectives that must be mastered to demonstrate this competency.

COMPETENCY:

The Teacher will:

teach a lesson

PERFORMANCE OBJECTIVE:

02049 The student will demonstrate his skill in applying:

a. a behavioral objective
b. a seven-step structure

These skills will be applied in two ten minute teaching episodes. One is in a 1 to 1 format and the other in a 1 to 3 grouping. The attached checklist will be used for critiquing.

04107 Given an observation checklist, the student will evaluate a series of lessons taught by his peers. The checklist will have a scale of 1 to 7 with 7 as the highest point on the scale. Attention will be focused on the following areas of the lesson presentation:

a. beginning of the lesson
b. clarity of presentation
c. pacing of the lesson
d. pupil participation
e. ending the lesson
f. selection of content
g. selection and use of supplementary materials
h. evaluation procedures utilized
i. relationship of planning and performance

Thus, the competency is general and program-related and the performance objectives are specific and course related. Both competencies and performance objectives can be changes to reflect new trends, emphases, or even just to improve the statements.

However, the changes must be made according to a specified process devised and approved by the faculty. This process allows for the examination of the entire program to determine the effect of the proposed change. And all changes are to be made with the full knowledge and approval of each faculty member.

Needs Assessment

Needs assessment in this design will include testing of both exit and prerequisite skills. The exit test, given before instruction, can determine which performance objectives the student has already mastered. If the student can demonstrate a portion of the skills, instruction will be provided for the remaining skills. If the student demonstrates his mastery of all of the objectives, then he can immediately exit from that part of the system and receive credit without putting in "seat time."

The test of prerequisite skills is the next major category of pre-instruction diagnosis. Before a student begins any portion of the instruction sequence he must demonstrate that he possesses those skills upon which the instruction is based. The prerequisite skills are identified through a process of:

1) sequencing the course objectives and
2) conducting a task analysis to break down each behavior into the major component parts.

Delivery System

No attempt is being made to standardize the delivery system to be used in the instructional program. These are the prerogative of the individual professors. The design of this instructional system allows the continued use of many modes of instruction. However, the faculty has agreed implicitly and explicitly that the competencies need not be attained through formal courses.

At this time several new delivery systems are being tried out. Some professors are managing their classes on an individualized basis using self-instructional learning modules they have developed. Some professors are combining the individualized approach with some large group class meetings for discussion and interaction. New emphasis is being placed upon field experiences throughout the entire program, and there is increased use of microteaching techniques.

Evaluation

Evaluation consists of three major process:

1) exit test at the end of instruction to determine if the student has then mastered each performance objective,

2) a follow-up of the student as he demonstrates these skills on the job, and

3) a follow-up of the students of our graduates

All exit tests in the instructional system are criterion-referenced. The tests for each set of objectives (i.e. course) are divided into two parts--1) written, and 2) performance. But the effort is to have as many of the items on a performance basis as possible. One of the most unique aspects of the testing program is the esamination being developed for intern teaching. This is a test which is administered, for the most part, in an actual school setting where the student demonstrates his teaching skills.

Tests when completed will include not only the test items themselves, but also the directions for administering the test, directions to the student who is taking the test, scoring directions and necessary forms.

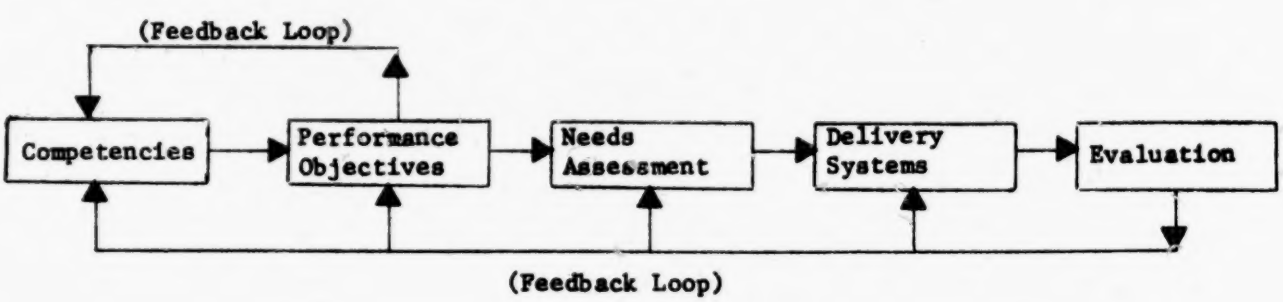
The follow-up studies are being initiated by the College of Education's Assessment and Renewal Unit, which is collecting the base data. Further design of the follow-up procedures and total program evaluation will be contracted to an outside source.

Summary of Instructional System

Figure 1 below illustrates an overview of the entire instructional system design.

Figure 1

A COMPETENCY-BASED INSTRUCTIONAL SYSTEM



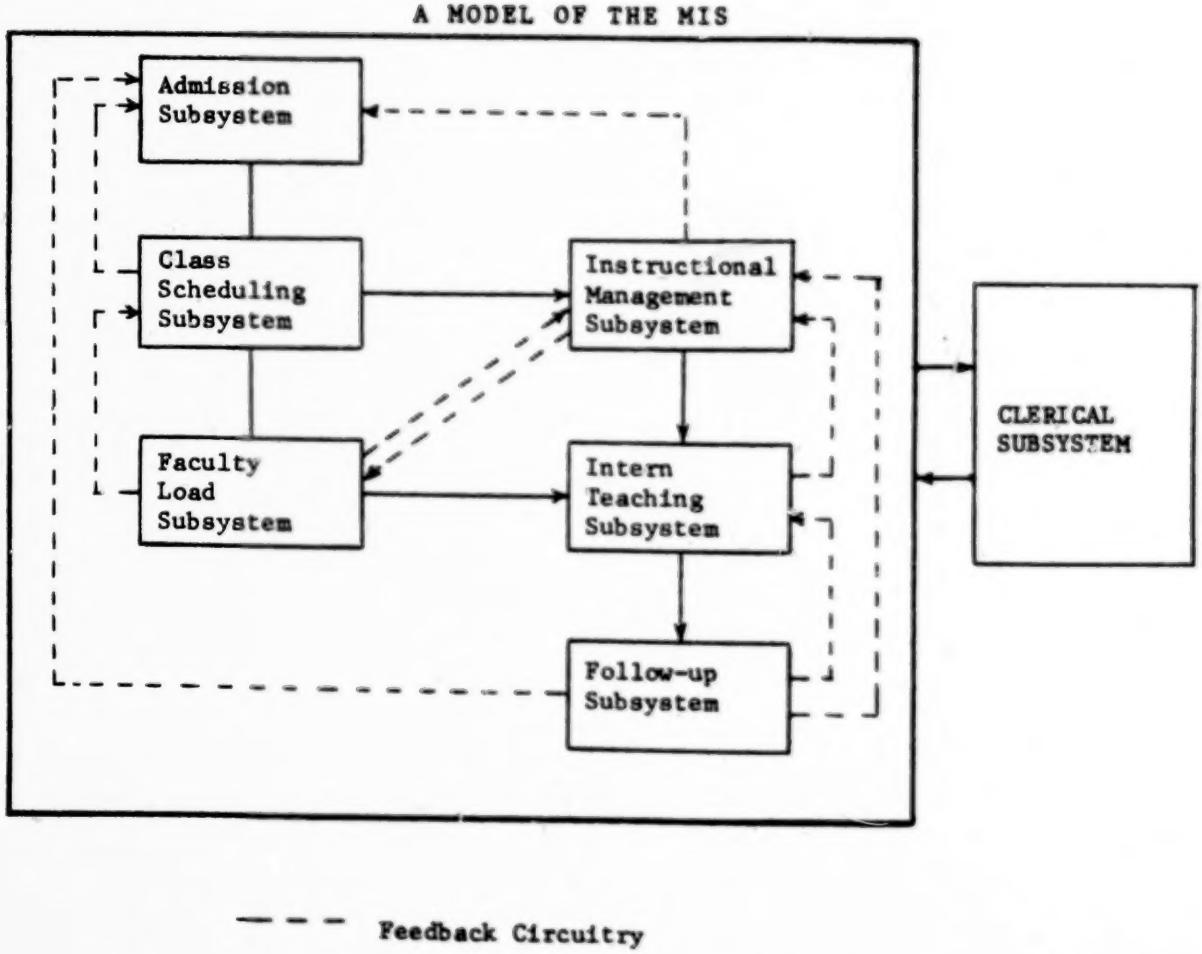
Management Information System

The major purpose of the VAE Management Information System (MIS) is to select, store, process, and transmit information to the faculty at a time when it can most efficiently be used, enabling them to make better decisions.

The MIS consists of seven subsystems--Admissions, Class Scheduling, Faculty Load, Instruction Management, Intern Teaching, and Follow-up Subsystem with the Clerical Subsystem facilitating the functioning of the other subsystems. Figure 2 shows the relationship and feedback circuitry of the VAE subsystems

Figure 2

A MODEL OF THE MIS



Although the MIS is a computer-based system, every effort has been made to insure that the most efficient procedure is formulated, yet keeping within the constraints placed upon it by the philosophy of the faculty and the availability of staff.

The development of the VAE system followed these steps:

1. Defined system goals.
2. Identified subsystems.
    a. Specified goal for each subsystem
    b. Established system constraints
    c. Designed summary procedure (flowchart)
    d. Identified needed data to accomplish goal
    e. Identified data source
    f. Identified data update procedures
    g. Identified retention of data
    h. Identified end use of data
3. Compared steps a-h for all subsystems for duplication or possible applicability to more than one subsystem.
4. Eliminated duplicate data requirements.
5. Evaluated the data items for frequency of need and value of the data to the subsystem versus various means and costs of gathering the data.
6. Designed collection and management of data procedures.
7. Developed step-by-step procedure (detailed flowcharts).
8. Developed software (forms or computer programs).
9. Documented subsystem on a preliminary basis.
10. Trained appropriate personnel.
11. Pilot tested the subsystem
12. Implemented the subsystem.
13. Documented subsystem in final form.

Data Bank

The data bank consists of several computerized files containing the following data:

1. Student profile data such as address, age, honor point average, total credit hours, etc.

2. Student transcripts = courses taken, date taken, grade received, courses currently being taken.

3. Plan of work for each student = the courses he is scheduled to take in his program and when he will take them.

4. Objectives covered in each course and the competencies with which they are matched.

5. Student's objective record = which objectives he has completed, data of completion, length of time to complete the objective, the exit test score, and the number of times he took the exit test.

6. Evaluation of intern teacher performance.

7. Faculty load data = classes taught, committee work, research and developmental work.

From this data a variety of reports are easily accessible by the faculty.

Figure 3 shows the major types of reports that are available.

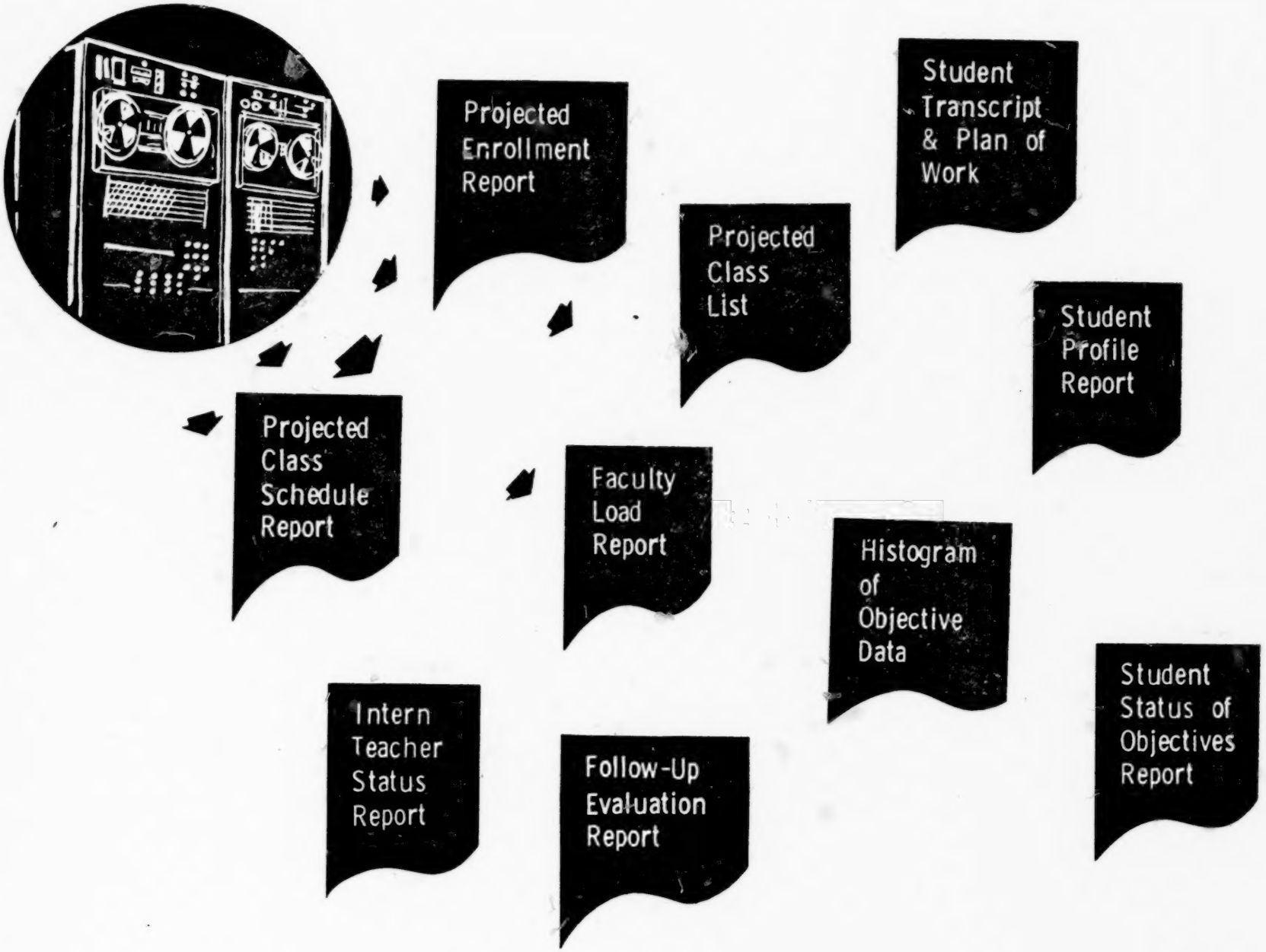


FIGURE 3

KINDS OF MAJOR REPORTS AVAILABLE FROM DATA BANK

Documentation

The key to the successful operation of the system is the documentation manuals. The major criteria in the preparation of the manuals have been (1) ease in reading and comprehending, and (2) easy and immediate access to the needed information. There are six manuals being developed:

1. Faculty Manual = includes policies and procedures important to faculty members.
2. Instructional System Manual = includes the development of the system, and the syllabus for each course, including handouts and student performance models.
3. Referral Manual = includes all necessary information to process a student through the admissions subsystem.
4. Computer Operations Manual = includes explanation of computer operations.
5. Equipment Operations Manual = includes location of equipment and instructions for use.
6. Clerical Manual = includes analysis of all clerical tasks.

These manuals include flowcharts of the major processes, both summary and detailed, specifications of all data files, hardware specifications, software, performance specifications where appropriate, performance schedules, system modification procedures, decision structure tables, departmental policies, and a complete digest of the Instructional and Management Information Systems design.